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10/037,767	10/23/2001	Changick Kim	AP118TP	7559

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EXAMINER	
LU, TOM Y	
ART UNIT	**PAPER NUMBER**
2621	

DATE MAILED: 12/13/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/037,767	KIM, CHANGICK	
	Examiner	Art Unit	
	Tom Y Lu	2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-19 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-5 and 9-16 is/are rejected.

7)☒ Claim(s) 6-8 and 17-19 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 23 October 2001 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claims 1-5 and 9-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over De Garido (EP 585573 A2) in view of Moronaga et al (U.S. Patent No. 5,229,864).

a. Referring to Claim 1, De Garido discloses (a) obtaining a reconstructed block-based pixel representation of the digital data (see figure 1); (b) extracting a DC coefficient for each block in the pixel representation based on values of selected pixels in that block to generate a map of DC coefficients (see figure 2, page 3, lines 57-58, the "selected pixels" are the signals that are indicative of DC and AC coefficient values of compressed blocks of image data representative of the image regions to be decoded); (c) for each pixel block, predicting lower frequency AC coefficients using the DC coefficient for that pixel block and a select number of neighboring DC coefficients in the DC coefficient map to construct a corresponding partial transform-coefficient block (page 3, lines 54-55 and page 4, lines 29-31, the corresponding partial transform-coefficient block is a block with predicted AC coefficients); (d) classifying each pixel block based on the predicted AC coefficients in the corresponding partial transform-coefficient block (page 4, line 54-56, zonal classification is applied to measure the activity level of the

blocks, and define them as low activity blocks or high activity blocks); and (e) performing a low-pass filtering operation on select pixels in select pixel blocks on a block-by-block basis based on the classification of that block, the locations and values of predicted non-zero AC coefficients in the corresponding partial transform block, and certain pixel values in that block (de-blocking scheme at line 6, page 6, performs low pass operation to remove blocking artifacts in smooth regions, which are high frequency regions, lines 6-10, page 6; "select pixels" are pixels in the select pixel blocks in smooth regions; the select pixel blocks, high activity blocks and low activity blocks, are defined based on the zonal classification; and the claimed "certain pixel values" are the values of corresponding pixels to the selected non-zero AC coefficients within the select blocks). Although De Garido does not explicitly disclose predicting "a select number of lower frequency AC coefficients", however, it would have been an obvious matter of design choice to modify the De Garido's reference by selecting only lower frequency AC coefficients, since applicant has not disclosed that predicting only lower frequency AC coefficients solves any stated problem or is for any particular purpose and it appears that predicting all AC coefficients would perform equally well in coding. Additionally, De Garido teaches the de-blocking scheme is implemented effectively based on the measurements of the block activity (page 6, line 6), however, De Garido does not explicitly teach the low-pass filtering operation is performed selectively. Moronaga at column 11, lines 57-67, teaches different low-pass filters, the de-blocking in De Garido, are carried

about according to the different block activities that implies the low-pass filtering is performed selectively according to the block activities. At the time the invention was made, a person of ordinary skill in the art would have been motivated to do this because it allows use of low-pass filtering to reduce the distortion appearing on the contour of the block according to the activity in a block, and will not get rid of needed pixel information, as Moronaga at column 12, lines 16-17, 24-35, states "when the activity of a block of interest is lower than the threshold value..., the LPF ... selects the coefficients K1 to K4... thereby reducing a distortion appearing on the contour of the block.... Conversely, when the activity of a given block is higher than the threshold value Th,.. the pixels X2 and X3 at the border between the blocks are not corrected at all".

b. With regard to Claim 2, the combination of De Garido and Moronaga teaches predicting lower frequency AC coefficients (predicting five lowest frequency AC coefficients in each pixel block is a matter of design choice, and the explanation is given in Claim 1).

c. Referring to Claim 3, the combination of De Garido and Moronaga teaches wherein the classifying of each pixel block in step (d) comprises comparing the absolute sum of the predicted AC coefficients in the corresponding partial transform block to a threshold (De Garido teaches the classification of the block activity is done by means of thresholds for each AC coefficient, page 4, lines 57-58. Moronaga proposes whether a block should be classified as high activity

block or low activity block based on the amount of high frequency components, which includes counting number of AC coefficients, and counting is equivalent to summing, column 11, lines 46-61; and therefore, by adapting Moronaga's block activity classifying technique in De Garido, it would allow De Garido to classifying each pixel block as high activity block or low activity block by comparing the absolute sum of the predicted AC coefficients in the corresponding partial transform block to a threshold. And a person of ordinary skill in the art would be motivated to do this because Moronaga's block activity classifying technique is another alternative to De Garido's, and it would perform equally well to serve the purpose of classifying the blocks).

d. With regard to Claim 4, see explanation in Claim 3.

e. With regard to Claim 5, the combination of De Garido and Moronaga teaches wherein step (e) comprises applying a strong low-pass filter to boundary region pixels in select low-activity and applying a weak low-pass filter to pixels in select-high activity blocks (Moronaga: column 11, lines 64-68 and column 12, lines 1-30).

f. With regard to Claim 9, see explanation in Claim 1 (note De Garido teaches his invention is a system, which contains all the apparatus components to implement method steps mentioned in Claim 1. De Garido: page 2, line 5).

g. With regard to Claim 10, see explanation in Claim 4.

h. With regard to Claim 11, see explanation in Claim 5.

i. With regard to Claim 12, the only difference between Claim 1 and Claim 12 is Claim 12 calls for additional limitation of "a machine-readable medium having a program", which De Garido teaches his system is a computer system, which inherently includes a machine-readable medium having a program.

j. With regard to Claim 13, see explanation in Claim 2.

k. With regard to Claim 14, see explanation in Claim 3.

l. With regard to Claim 15, see explanation in Claim 4.

m. With regard to Claim 16, see explanation in Claim 5.

Allowable Subject Matter

2. Claims 6-8 and 17-19 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

a. Claims 6 and 17 both define features of, for each low-activity block, applying the strong low-pass filter to smooth boundary region pixels in both the horizontal and vertical directions if all the predicted AC coefficients in the corresponding partial transform-coefficient block have absolute values less than a predetermined value; smooth boundary region pixels in the vertical direction if at least one AC coefficient in a first select location in the corresponding partial transform-coefficient block has an absolute value greater than or equal to the predetermined value; and smooth boundary region pixels in the horizontal direction if at least one AC coefficient in a second location in the corresponding partial transform-

coefficient block has an absolute value greater than or equal to the predetermined value. These features are not taught or suggested in the art of record.

b. Claim 7 is dependent upon Claim 6.

c. Claim 18 is dependent upon Claim 17.

d. Claims 8 and 19 both define features of applying weak low pass filter to smooth pixels inside the block in the horizontal direction if a difference between values of a first adjacent pixels and a difference between values of a second two adjacent pixels are both less than a predetermined parameter and smooth pixels in the vertical direction if a difference between values of a third two adjacent pixels and a difference between values of a fourth two adjacent pixels are both less than the predetermined parameter. These features are not taught or suggested in the art of record.

Conclusion

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a. Lee et al, U.S. Patent No. 6,539,060 B1, see column 8.

b. Price et al, U.S. Patent No. 6,427,031 B1, see column 2.

c. Sampson et al, "A method for enhancing the picture quality of low bit-rate block-coded images", IEEE, July 1995.

d. Park et al, "Blocking effect reduction of JPEG images by signal adaptive filtering", IEEE, February 1998.

e. Park et al, "A postprocessing method for reducing quantization effects in low bit-rate moving picture coding", IEEE, February 1999.

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tom Y Lu whose telephone number is (703) 306-4057. The examiner can normally be reached on 8:30AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo H Boudreau can be reached on (703) 305-4706. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Tom Y. Lu

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